

Express Mail Certificate No. EV298592481US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
APPLICATION FOR LETTERS PATENT

Applicants: SHIH-MING LIN

Title : DETACHABLE CONNECTOR FOR A  
LAMP ON A PENDENT LAMP

9 Claims

8 Sheets of Drawings

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# 1     **DETACHABLE CONNECTOR FOR A LAMP ON A PENDENT LAMP**

## 2     BACKGROUND OF THE INVENTION

### 3     1. Field of the Invention

4             The present invention relates to a detachable connector, and more  
5     particularly to an detachable connector for a lamp on a pendent lamp to easily  
6     and quickly attach the lamp to or detach the lamp from the pendent lamp.

### 7     2. Description of Related Art

8             A pendent lamp is suspended from ceiling to provide illumination in  
9     addition to a decorative effect indoors.

10            With reference to Fig. 8, a conventional pendent lamp comprises a frame  
11     (40), a suspension member (46), multiple connecting arms (44) and a  
12     corresponding number of lamps (42). The suspension member (46) such as a  
13     chain, a post or the like has an upper end (not numbered) and a lower end (not  
14     numbered). The upper end is attached to a ceiling (not shown), and the frame (40)  
15     is attached to the lower end. The connecting arms (44) such as tubes respectively  
16     have inner ends (not numbered) and outer ends (not numbered). The inner ends  
17     are securely attached to and extend out from the frame (40). The lamps (42) are  
18     connected respectively to the outer ends of the connecting (44). Wires (not  
19     shown) are connected to the lamps (42), extend through the corresponding  
20     connecting arms (44), the frame (40) and the suspension member (46) and are  
21     electrically connected to a power source (not shown). Accordingly, the lamps  
22     (42) will light and provide illumination.

23            However, the wires connected to the lamps (42) are not detachable from  
24     the frame (40) and the lamps (42). Therefore, the connecting members (44) and

1 the lamps (42) of the conventional pendent lamp are securely connected to and  
2 cannot be detached from the frame (40) and prevent a person of ordinary skill  
3 from disassembling the conventional pendent lamp at home. Since the  
4 conventional pendent lamp is large, transporting the conventional pendent lamp  
5 requires a large space and is troublesome.

6 To overcome the shortcomings, the present invention provides an  
7 detachable connector for a lamp of a pendent lamp to mitigate or obviate the  
8 aforementioned problems.

#### 9 SUMMARY OF THE INVENTION

10 The main objective of the invention is to provide an detachable  
11 connector for a lamp on a pendent lamp to allow the lamp to be detachable from  
12 the frame of the pendent lamp so a person can conveniently and easily connect  
13 the lamps to or detach the lamps from the frame.

14 The detachable connector for a lamp on a pendent lamp has a holder, a  
15 socket, an attaching device, a plug and a connecting tube. The holder is mounted  
16 in the frame of the pendent lamp. The socket is detachably attached to the holder  
17 by the attaching device and electrically connects to a power source. The plug  
18 corresponds to and is selectively inserted into the socket to electrically connect  
19 to the socket and is electrically connected to the lamp. The connecting tube is  
20 attached securely to the plug and is connected to the lamp. With such a  
21 detachable connector, the lamp is detachable from the frame of the pendent lamp  
22 such that a person can easily and conveniently assemble or disassemble the  
23 pendent lamp. Furthermore, the space required to transport or store the  
24 disassembled pendent lamp is reduced.

1           Other objectives, advantages and novel features of the invention will  
2   become more apparent from the following detailed description when taken in  
3   conjunction with the accompanying drawings.

#### 4   BRIEF DESCRIPTION OF THE DRAWINGS

5           Fig. 1 is an exploded perspective view of a detachable connector in  
6   accordance with the present invention in a frame and a connecting member to a  
7   lamp of a pendent lamp;

8           Fig. 2 is an exploded perspective view of a first embodiment of the  
9   detachable connector in Fig. 1;

10          Fig. 3 is a side plan view in partial section of the adapter in Fig. 2;

11          Fig. 4 is an operational side plan view in partial section of the adapter in  
12   Fig. 2;

13          Fig. 5 is an operational side plan view in partial section of the adapter in  
14   Fig. 2;

15          Fig. 6 is an exploded perspective view of a second embodiment of a  
16   detachable connector in accordance with the present invention for a lamp of a  
17   pendent lamp;

18          Fig. 7 is an exploded perspective view of a third embodiment of a  
19   detachable connector in accordance with the present invention for a lamp of a  
20   pendent lamp; and

21          Fig. 8 is a perspective view of a conventional pendent lamp in  
22   accordance with the prior art.

#### 23   DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

24          With reference to Figs. 1 and 2, a detachable connector in accordance

1 with the present invention for a pendent lamp having a suspension member (not  
2 shown), a frame (30), multiple connecting members (34) and a corresponding  
3 number of lamps (32) selectively connects a connecting member (34) to the  
4 frame (30). The detachable connector comprises a holder (10), a socket (12), an  
5 attaching device (not numbered), a plug (14) and a connecting tube (16). The  
6 holder (10) is tubular, is mounted in the frame (30) of the pendent lamp and has a  
7 central chamber (not numbered), an inner open end (not numbered) and an outer  
8 open end (not numbered). In an optional embodiment, with further reference to  
9 Fig. 3, the holder comprises a body (20), a bottom cap (21), a sliding tube (22),  
10 multiple balls (23), a spring (24) and a pushing bar (26). The body (20) is tubular  
11 and has an outer surface (not numbered), an inner surface (not numbered), an  
12 inner open end (not numbered), an outer open end (not numbered), an elongated  
13 through hole (202) and a tapered surface (204). The elongated through hole (202)  
14 is longitudinally defined in the outer surface of the body (20), and the tapered  
15 surface (204) is formed on the inner surface of the body (20) and corresponds to  
16 the elongated through hole (202). The bottom cap (21) is attached to the inner  
17 open end of the body (20) to close the inner open end and has a hole (not  
18 numbered) defined through the bottom cap (21). The sliding tube (22) is  
19 moveably mounted in the body (20) through the outer open end and has an outer  
20 surface, a central passage (not numbered), a tapered surface (222) and multiple  
21 bores (224). The tapered surface (222) is formed on the outer surface of the  
22 sliding tube (22) and corresponds to the tapered surface (204) in the tubular body  
23 (20). The bores (224) are defined in the tapered surface (222) of the sliding tube  
24 (22), have a depth and communicate with the central passage. The balls (23) are

1 moveably mounted respectively in the bores (224), and each ball (23) has a  
2 diameter larger than the depth of the corresponding bore (224). The spring (24) is  
3 mounted between the bottom cap (21) and the sliding tube (22) to push the  
4 tapered surface (222) on the sliding tube (22) against the tapered surface (204) in  
5 the body (20). Because each ball (23) has a diameter larger than the depth of the  
6 corresponding bore (224), the top of each ball (23) is pressed into the central  
7 passage. The pushing bar (26) is pivotally mounted on the body (20) and has a  
8 bottom penetrating through the elongated through hole (202) and corresponding  
9 to the sliding tube (22).

10 The socket (12) is detachably attached to the holder (10) at the inner  
11 open end with the attaching device and is electrically connected to a power  
12 source with a first set of wires (not shown). In the optional embodiment, the  
13 socket (12) is inserted into the hole in the bottom cap (21).

14 In a first embodiment, the attaching device comprises two first ears  
15 (102), a cap (13) and two bolts (15). The first ears (102) are formed on and  
16 extend from the holder (10), and each first ear (102) has a threaded hole (104). In  
17 the optional embodiment, the first ears (102) are formed on and extend from the  
18 bottom cap (21). The cap (13) is formed around the socket (12) and has two  
19 second ears (132) formed on the (13) cap and respectively corresponding to the  
20 first ears (102) on the holder (10). Each second ear (132) has a through hole (134)  
21 defined through the second ear (132) and aligning with the threaded hole (104) in  
22 the corresponding first ear (102). The bolts (15) penetrate respectively the  
23 through holes (134) in the second ears (132) and are screwed respectively into  
24 the threaded holes (104) in the first ears (102) on the holder (10) to attach the

1 socket (12) to the holder (10).

2         The plug (14) corresponds to and is selectively inserted into the socket  
3 (12) from the outer open end in the holder (10) to electrically connect to the  
4 socket (12). The plug (14) is electrically connected to the lamp (32) of the  
5 pendent lamp with a second pair of wires (not shown). The connecting tube (16)  
6 has an outer surface (not numbered), an inner end (not numbered) and an outer  
7 end (not numbered), is attached securely to the plug (14) and is connected to the  
8 lamp (32) of the pendent lamp through a connecting member (34) such as a tube.  
9 A threaded hole (162) is defined in the outer end of the connecting tube (16), and  
10 the connecting member (34) has an exterior thread (not shown) screwed into the  
11 threaded hole (162) in the connecting tube (16). The second pair of wires extend  
12 through the connecting tube (16) and the connecting member (34) and are  
13 connected between the lamp (32) and the plug (14).

14         With further reference to Fig. 4, the inner end of the connecting tube (20)  
15 abuts the tops of the balls (23) and pushes the sliding tube (22) to move relative  
16 to the tubular body (20) when the plug (14) is inserted into the socket (12). With  
17 the movement of the sliding tube (22) relative to the body (20), the tapered  
18 surface (222) on the sliding tube (22) separates from the tapered surface (204) in  
19 the body (20), and the balls (23) retract into the bores (224) to allow the  
20 connecting tube (22) to pass over the balls (23). Consequently, the plug (14) can  
21 be inserted into the socket (12), and the lamp (32) is selectively connected to a  
22 power source through the second pair of wires, the plug (14), the socket (12), the  
23 first pair of wires and a switch (not shown), and the lamp can be turned on to  
24 provide illumination. With a restitution force provide by the spring (24), the balls

1 (23) are squeezed securely between the tapered surface (204) in the body (20)  
2 and the outer surface of the connecting tube (16). Accordingly, the connecting  
3 tube (16) is held securely in the holder (10) by the balls (23) and will not escape  
4 from the holder (10) even when the connecting tube (16) is pulled.

5 To release the connecting tube (16) with the plug (14) from the holder  
6 (10) with the socket (12), the pushing bar (26) is pivotally rotated and pushes the  
7 sliding tube (22) to move with the bottom of the pushing bar (26). With the  
8 movement of the sliding tube (22), the balls (23) will leave a position where the  
9 balls (23) abut against the outer surface of the connecting tube (16). Accordingly,  
10 the force for securely holding the connecting tube (16) provided by the balls (23)  
11 is released, the connecting tube (16) with the plug (14) can be detached from the  
12 holder (10). Because the plug (14) is detachably attached to the socket (12), the  
13 lamp (32) with the connecting tube (16) and the plug (14) can be detached from  
14 the socket (12). Therefore, the lamps (32) can be disassembled from the frame  
15 (30), and any person can conveniently and easily assemble the lamp (32) to the  
16 frame (30) by inserting the plug (14) into the socket (12). Accordingly, the lamps  
17 (32) with the connecting members (34) can be detached from the frame (30)  
18 when the pendent lamp is packaged, such that the space for transporting or  
19 storing the pendent lamp is reduced.

20 With reference to Fig. 6, a second embodiment of the attaching device  
21 comprises two hooks (106) and a cap (13'). The hooks (106) are formed on the  
22 holder (10). The cap (13') is formed around the socket (12') and has two through  
23 holes (136) formed on the cap (13') and respectively corresponding to the hooks  
24 (106) on the holder (10'). When the socket (12') is inserted into the open end of



1 the holder (10'), the hooks (106) will hook on the through holes (136) on the cap  
2 (13') to securely attach the socket (12') to the holder (10').

3 With reference to Fig. 7, a third embodiment of the attaching device  
4 comprises two hooks (138) and two loops (108). The hooks (138) are integrally  
5 formed on the socket (12''), and the loops (138) are formed on the holder (10'')  
6 and respectively correspond to the hooks (138) on the socket (12''). The socket  
7 (12'') is securely attached to the holder (10'') when the hooks (138) respectively  
8 engage the loops (108).

9 With reference to Figs. 3 and 4, the socket (12',12'') in the second and  
10 third embodiment is L-shaped so the space in the frame (30) for mounting  
11 multiple adapters can be reduced.

12 Furthermore, the detaching device allows the socket (12,12',12'') to be  
13 detached from the holder (10,10',10'') when the socket (12,12',12'') or the holder  
14 (10,10',10'') is damaged.

15 Even though numerous characteristics and advantages of the present  
16 invention have been set forth in the foregoing description, together with details  
17 of the structure and function of the invention, the disclosure is illustrative only,  
18 and changes may be made in detail, especially in matters of shape, size, and  
19 arrangement of parts within the principles of the invention to the full extent  
20 indicated by the broad general meaning of the terms in which the appended  
21 claims are expressed.